REMARKS

Claims 1-7 stand examined and are rejected on various grounds. These objections and rejections are addressed in the appropriate sections below. By virtue of this response, new claims 8-17 have been added. Support for new claim 8 is found in the Specification on page 1, line 12. Support for new claim 9 is found in the Specification at page 5, line 4. Support for new claim 10 is found in the Specification at page 4, line 31 and page 9, lines 18-23. New claim 11 combines original claims 1, 2 and 4 and new claim 8 into independent form. New claims 12-15 combine new claim 11 with original claims 3, 5, 6 and 7, respectively. New claims 16 and 17 combine new claim 11 with new claims 8 and 9, respectively. No new matter has been added. Accordingly, claims 1-17 are currently under consideration.

<u>In the Drawings</u>:

The Examiner has objected to the drawings for allegedly failing to comply with 37 CFR 1.84(p)(5) because reference characters 103, 104, and 105 were not mentioned in the description. Applicant respectfully requests the Examiner withdraw the objection to the drawings.

Applicant respectfully submits the reference numbers 103, 104, and 105 are mentioned in the description. In the specification on page 4, line 28, reference number 103 refers to an insulating film. In the specification on page 4, lines 16 and 28, reference number 104 refers to a p-type electrode. In the specification on page 4, lines 19-20, reference number 105 refers to an n-type electrode.

Because the specification properly mentions all reference characters in the Figures in compliance with 37 CFR 1.84(p)(5), Applicant believes that no amendment to the specification and no corrected drawing sheets are necessary.

<u>Rejections under 35 U.S.C. § 103 (a)</u>:

Claims 1-7 stand rejected under 35 U.S.C. § 103(a) as being allegedly obvious over U.S. Publication No. UA2003/0210720 to Reid in view of U.S. Publication No. US 2002/0039374 to Onomura et al. Applicant respectfully traverses this rejection.

There is no teaching, suggestion, or motivation in Reid or Onomura to make it obvious to a person of ordinary skill in the art to combine Reid with Onomura to arrive at the combinations of features recited in claim 1.

Reid is specifically directed to a semiconductor laser adapted for telecommunications applications. See, e.g., Reid at [0008]-[0012], [0049] and throughout. Semiconductor lasers for telecommunications applications must operate in narrow wavelength ranges centered around 1.3μm or 1.5μm. Two fundamental problems of semiconductor lasers for telecommunications applications are generating sufficient power and efficiently coupling this power into an optical fiber. Reid at [0008]. To generate high power, Reid teaches that the cavity length and ridge width can be increased. Reid at [0005]. However, increasing cavity length causes a decrease in efficiency because of optical losses within the cavity due to absorption of the generated infrared light. Reid at [0006]. For the wavelengths and materials used in the Reid applications, absorption losses are due primarily to absorption by the p-type region adjacent the active layer. Reid at [0006], [0010]. Thus, Reid is directed to laser structures for telecommunications applications that decrease the overlap of the optical mode with the p-type region and structures that produce a beam having a reduced far field for efficient coupling into an optical fiber.

Onomura is specifically directed at nitride semiconductor laser diodes emitting in a narrow wavelength region around 400nm. See Onomura at [0009] and throughout. GaN laser diodes having these short wavelengths are desired for use in optical recording systems because of the ability to focus the near-UV light into a small spot size, thus increasing recording density. A fundamental problem to be solved with respect to nitride semiconductor laser diodes operating in this wavelength range is to increase their continuous operating lifetime. Onomura at [0006]. GaN laser diodes require a thick AlGaN clad layer adjacent to the active layer to properly control the transverse mode. Onomura at [0007]. However, the thick AlGaN clad layers have a tendency to

crack or produce crystal defects, resulting in unstable laser oscillation which in turn results in increased leakage current and corresponding generation of heat, reducing the lifetime of the laser. Onomura at [0008]. Onomura is directed to structures that are designed to have reduced cracking in the thick AlGaN clad layers to increase the continuous operating lifetime of a nitride semiconductor laser diode. See Onomura at [00054].

Claim 1 of the present application recites a nitride semiconductor laser device chip having a length L1 in a longitudinal direction of greater than 500μm, and a length L2 in a width direction of greater than 200μm, wherein L1/L2 is greater than 2.5.

There is no teaching, suggestion or motivation in Reid that its improvements for infrared lasers would be applicable to the nitride laser chips recited claim 1 of the present application or to the nitride lasers of Onomura. Infrared lasers such as those disclosed in Reid are known not to function in the optical storage applications of nitride lasers because their long wavelength prohibits focusing to an optical spot size sufficiently small to result in useful recording densities. Similarly, nitride lasers would not function in the telecommunications applications of Reid because absorption of 400nm light in optical fibers prohibits efficient long-distance transmission. Therefore, it would not be obvious to one of skill in the art to combine Reid with Onomura.

Furthermore, there is no suggestion, teaching or motivation in Reid that a cavity length optimal for an infrared laser for use in telecommunications applications would be applicable to a nitride semiconductor laser. As stated above, the cavity length limitations for the lasers of Reid are controlled by absorption of infrared light by p-type layers made of materials optimized for infrared lasers. The nitride semiconductor laser chips recited in claim 1 and the nitride semiconductor lasers disclosed in Onomura are each made from completely different materials having absorption profiles different from the infrared lasers of Reid Moreover, the InGaAsP crystal disclosed in Reid has an isotropic cubic crystal structure. The nitride semiconductor laser chip recited in claim 1 has an anisotropic hexagonal crystal structure. The internal stress distribution of the anisotropic nitride semiconductor laser chip recited in claim 1 is quite different from that in the isotropic InGaAsP crystal disclosed in Reid. Therefore, the dimensions recited in claim 1 for the nitride semiconductor

laser chip cannot be taught or suggested from the dimensions of the InGaAsP laser chip disclosed in Reid. For these reasons, a person of ordinary skill in the art designing a nitride semiconductor laser would not look to geometrical limitations determined in Reid. Thus, it would not be obvious to one of skill in the art to combine cavity lengths from Reid with the nitride laser of Onomura. Therefore, the geometric limitations taught and disclosed by Reid are not relevant to the dimensions for the nitride semiconductor laser chip recited in claim 1.

Even if Onomura is combined with Reid, the teachings of Onomura do not cure the deficiencies of Reid with regard to the limitations recited in claim 1. Onomura teaches the use of a specific $Al_xGa_{1-x}N$ layer optical confinement layer having a certain thickness to reduce cracking. Onomura at [0054]. Onomura teaches away from using the length and width of the laser chip to increase operating lifetime because it focuses only on the use of specific layers to reduce inter-layer strains and defects to increase lifetime. Onomura at [0042]-[0074]. Although Onomura discloses a cavity length of 600μm, it does not disclose a chip width. See Onomura at [0051].

Moreover, nowhere in Onomura or Reid or the combination of the two has disclosed, taught or suggested that a semiconductor laser chip should have a length dimension that is dependent on a width dimension as recited by the limitation that the ratio of the chip length to its width be greater than 2.5 in claim 1. Although Reid discloses that a typical cavity length for an infrared semiconductor laser for telecommunications applications is 1-4mm, and its width can be 250-500μm for "handling purposes," it does not disclose, teach or suggest that the length should be dependent on the width, i.e., that the cavity length should be limited to one that is more than 2.5 times greater than the width. See Reid at [0048]. Instead, Reid teaches away from choosing a cavity length that is dependent on chip width by teaching that the cavity length should be chosen for maximum power and efficiency and that the chip width is determined only by handling considerations. See Reid at [0005], [0048]. Again, there is no mention of chip width in Onomura. Therefore, even the combination of Reid with Onomura does not disclose, teach or suggest all of the limitations recited in claim 1.

Because claims 2-7 depend from claim 1, and the limitations recited in claim 1 are not made obvious to a person skilled in the art by Reid or Onomura or a combination thereof, Applicant respectfully submits that claims 2-7 should be allowed.

CONCLUSION

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 245402006600. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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Respectfully submitted,

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